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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/042,182	01/11/2002	Sabina Houle	P 0276921 P12682	5990

7590 10/15/2003

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EXAMINER

DUONG, THO V

ART UNIT PAPER NUMBER

3743

DATE MAILED: 10/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/042,182

Applicant(s)

HOULE ET AL.

Examiner

Tho v Duong

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1 and 4-17 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

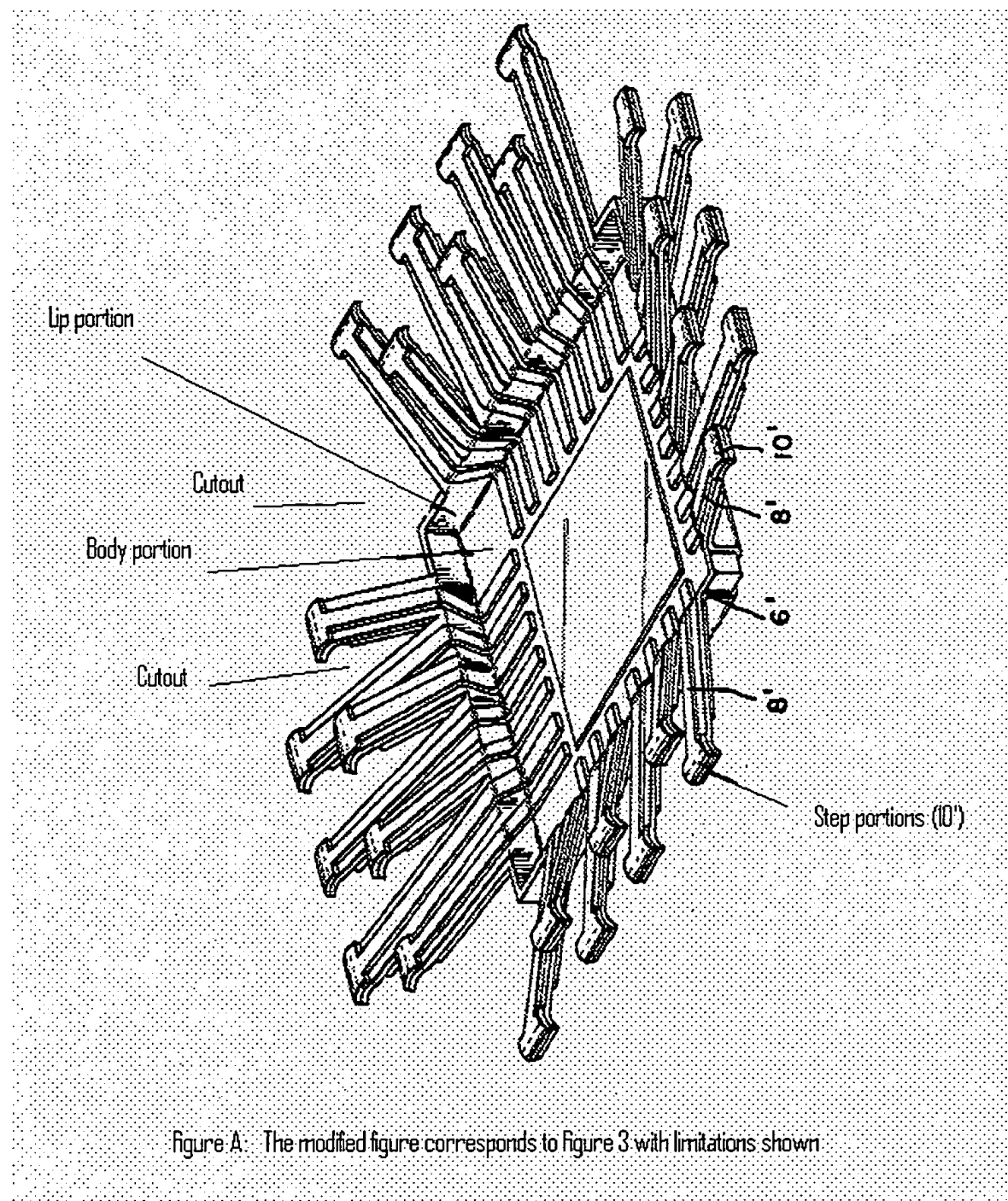
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 4,5,15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Andrews et al. (US 4,147,889). Andrews discloses (figures A, 3, 5 and column 2, line 26- column 4, line 31) an integrated heat spreader constructed and arranged to be adhesively affixed, with a sealant (solder), to at least a portion of a substrate (42'), comprising a rectangular body portion (shown in figure A); a solid continuous lip portion substantially vertically oriented relative to the body portion as shown in figure A; a plurality of copper step portions (10') adjacent to the lip portion, wherein the plurality of step portions are spaced apart by a plurality of cutouts wherein the plurality of step portions (10') are non-uniformly spaced since the distance between two adjacent step portions at the corner is farther than the other distance.

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Claims 1, 5, 15 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Takano (US 6,376,907). Takano discloses (figures 1, 7, 12 and column 7, lines 44-50) an integrated

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copper heat spreader (16 or 26) constructed and arranged to be adhesively affixed with a sealant (17), to at least of portion of a substrate (12), which a die (14) is mounted on; a rectangular body portion (26a); a solid continuous lip portion (26b) substantially vertically oriented relative to the body portion; and a plurality of step portions (26c) adjacent to the lip portion (26b) wherein the plurality of step portions (26c) are spaced a part by a plurality of cutouts (figure 7b)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-9, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takano in view of Houle et al. (US 6,469,381). Takano discloses substantially all of applicant's claimed invention as discussed above except for the limitations of the materials of the heat spreader's step portion and sealant is a silicone-based material. Takano further discloses (figure 1) that the heat spreader (16 or 26), which includes the body (26a), the lip (26b) and the step portion (26c), are made of a unitary body of a single material. Houle discloses (figure 3, and column 3, line 67- column 4, line 10) that a heat spreader (305) is used to dissipate heat from a heat source (303) wherein the heat spreader (305) can be made of carbon/carbon composite or carbon/copper composite comprising a matrix carbon fibers composite to obtain a high thermal conductivity heat spreader with lighter weight than metal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Houle's teaching in the Takano's heat spreader to obtain a high thermal conductivity heat spreader with lighter weight

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than metal. As regarding claim 14, Takano discloses (figure 1) that the heat spreader (16) is bonded on the substrate (12) by a sealant (17) but not that the sealant material is silicone based material. Houle discloses (column 3, lines 42-59) that the heat spreader (305) can be bonded on a substrate (301) by a silicone-based sealant material (307) to provide a more flexible bond between the heat spreader and the substrate to compensate for their different coefficients of thermal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Houle's teaching in Takano's integrated heat spreader to obtain a more flexible bond between the heat spreader and the substrate to compensate for their different coefficients of thermal expansion.

Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takano in view of Toy et al. (US 5,931,222). Takano substantially discloses all of applicant's claimed invention except for the limitation that at least the plurality of step portions are coated with nickel. Toy discloses (figure 1, column 7, lines 7-21 and column 10, lines 26-32) that an entire surface of heat spreader (18) is coated with nickel and further plated with gold at the step portion (25) of the heat spreader to prevent corrosion on the heat spreader. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Toy's teaching in Takano's heat spreader to prevent corrosion on the heat spreader

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takano in view of Lebonheur et al. (US 6,617,683). Takano discloses substantially all of applicant's claimed invention as discussed above except for the limitation that a thermal interface material of polymer is disposed between the die and the body portion of the heat spreader. Lebonheur discloses (figure 1 and column 3, lines 23-44) a thermal interface material of polymer (6) is

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disposed between a heat spreader (3) and a die (2) to transfer heat generated from the die to the heat spreader (3) and to decouple the stress transfer between the heat spreader and the die. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Lebonheur's teaching in Takano's integrated heat spreader to transfer heat and to decouple the stress transfer between the die and the heat spreader.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fujitsu (US 4,953,173) discloses a semiconductor that has an inverted tray-shaped support frame on top of a semiconductor.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tho Duong whose telephone number is (703) 305-0768. The examiner can normally be reached on from 9:30-6 PM.

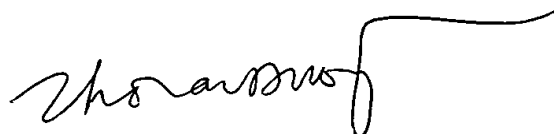
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Bennet, can be reached on (703) 308-0101. The fax phone number for the organization where this application or proceeding is assigned is (703)308-7764.

Any inquiry of a general nature or relating to status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0861.



TD

October 10, 2003



Tho Duong

Patent Examiner.